National Aeronautics and Space Administration

Space Flight Services

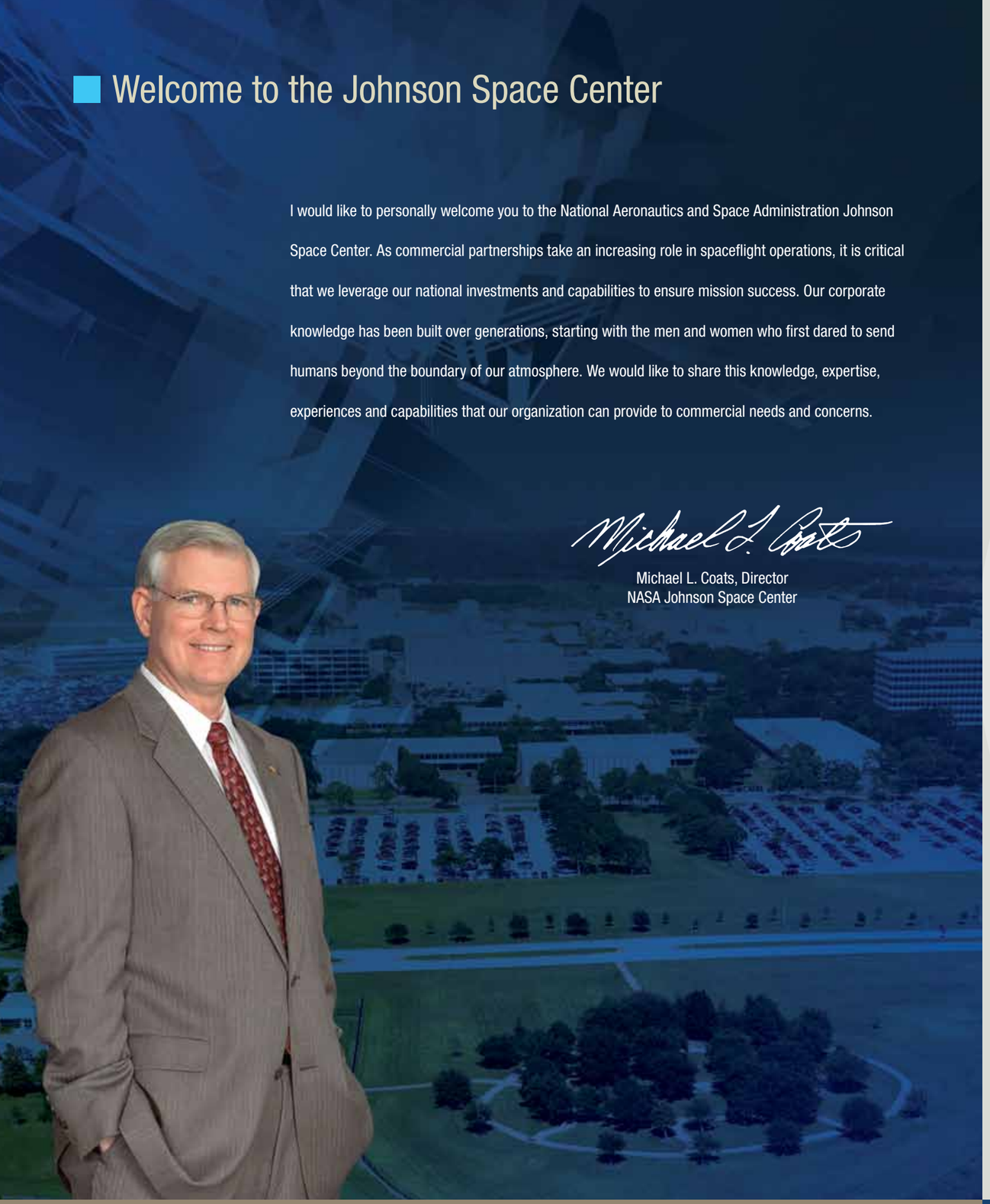
NASA Johnson Space Center

HOUSTON, TEXAS

Welcome to the Johnson Space Center

I would like to personally welcome you to the National Aeronautics and Space Administration Johnson Space Center. As commercial partnerships take an increasing role in spaceflight operations, it is critical that we leverage our national investments and capabilities to ensure mission success. Our corporate knowledge has been built over generations, starting with the men and women who first dared to send humans beyond the boundary of our atmosphere. We would like to share this knowledge, expertise, experiences and capabilities that our organization can provide to commercial needs and concerns.

Michael L. Coats, Director
NASA Johnson Space Center



NASA Johnson Space Center Space Flight Services

Integrated Human Space Vehicle Systems

- Avionics, Communication and Software
- Radiation Resistant Hardware
- Structure and Materials Development
- Integrated Power
- Thermal Management
- Mechanical Separation
- Integrated Spacecraft Propulsion
- Spacecraft Cockpit Rapid Prototyping Design

Life Support Systems & Environmental Control

- Space Suits
- Extra Vehicular Activity
- Habitats
- Regeneration
- Waste Management
- Space Medicine Support
- Space Habitability and Environmental Factors
- Human Adaptation & Countermeasures

Flight Design

- Ascent and Abort Performance
- On-Orbit Flight
- Proximity Operations
- Automated Rendezvous and Docking
- Entry Performance
- Landing Recovery Systems

Integrated Environments Testing and Analysis

- Launch Dynamics
- Entry Environments
- Space Environment (man-made and natural)
- Thermal Vacuum Chambers
- Electromagnetic Testing

Mission Operations

- Plan

Spaceflight Timelines
Orbital Flight and Trajectories
Spacecraft Monitoring System Parameters
Spacecraft Design for Operations Considerations

- Train

Flight Crews for Spacewalks
Flight Crews for Spacecraft Systems
Spaceflight Simulation Systems

- Fly

Real-Time Spaceflight Anomaly Risk Analysis
Spacecraft Control Systems for Mission Control
Worldwide Spacecraft Communications Network
Flight Procedures and Check List

Integrated Human Space Vehicle Systems

The **Johnson Space Center** has over 45 years of combined expertise in design of space vehicle systems, combining structural design, analysis, testing, dynamic loads analysis, and performance and materials evaluations for manned and unmanned space-faring vehicles. Specialty areas such as reliable pyrotechnics, power systems and power quality, fluids management, batteries performance, imagery analysis, micrometeoroid debris analysis and design, cockpit designs, radiation-hardened avionics, space environmental effects, thermal protection systems, and reliable software are integrated at the vehicle level for system level optimum performance.

We have the power to bring the disciplines and unique design requirements in an integrated fashion including the operation of the space vehicle. We can rapidly prototype conceptual spacecraft cockpit designs to explore cockpit concepts and evaluate designs. Although we are known for our contribution to aerospace, our expertise and facilities can also support a variety of other commercial applications.

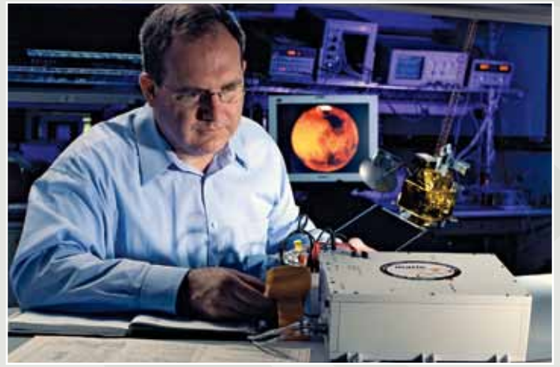
Structures and Materials Development

Spacecraft Cockpit Rapid Prototyping

Integrated Spacecraft Propulsion

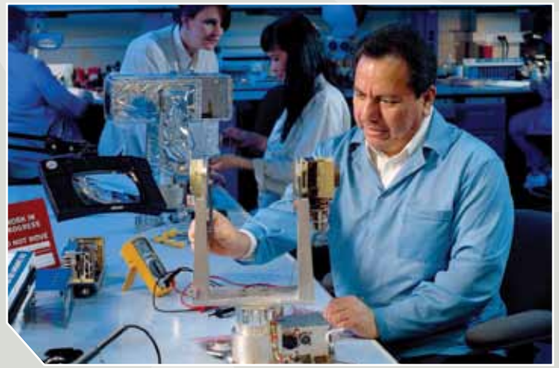
Integrated Power System Design

Thermal Management Design and Testing



Radiation Resistant Hardware

Spacecraft Pyrotechnic Separation Systems



Avionics, Communication and Software

Life Support Systems and Environmental Control

The Johnson Space Center is the world leader in human spaceflight for space suits, human health and performance, space medicine, extravehicular activity, environmental control, and regenerations systems. Space suits are unique because they are miniature, customized spacecraft. Providing protection, mobility, and life support to the crew during spacewalks is a requirement that all space suits must meet.

Optimizing human health and productivity for space exploration is one of the Johnson Space Center's missions. We have the capability to measure human performance in space and implement countermeasures to improve productivity. Experience has given us unique knowledge in the areas of air quality, potable water, urine monitoring, regenerative fluids, and hygiene activities. This knowledge supports human spacecraft design, space-system hardware design, flight-like simulation and testing of extravehicular activity hardware and operations, thermal systems hardware, environmental control systems, and integrated systems testing in pressures ranging from vacuum to one atmosphere.

Advanced Space Suit Development

Space Medicine Support

Waste Management Systems

Habitats

Human Adaptation and Countermeasures

Physiological Studies

Launch and Entry Space Suits

EVA Space Suits

Space Environmental Control

Space Habitability and Environmental Factors

Regeneration Systems Development

Flight Design

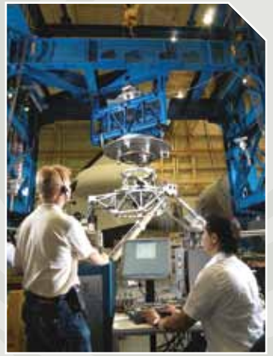
The **Johnson Space Center** offers unique capabilities in developing ascent, on-orbit, entry and landing recovery systems We also provide computer graphics for engineering visualization as well as state-of-the-art facilities for testing mechanical interfaces, emulating the motion of mechanical systems, simulating reduced-gravity environments, and the simulating and testing of the aerothermal heating experienced by spacecraft as they enter planetary atmospheres.

Aerodynamics, aerothermodynamics, fluid dynamics, guidance, navigation, and control, flight performance, mission design, and autonomous guidance, navigation, and control systems are only a few of the Johnson Space Center's engineering strengths. We also provide engineering design, development, testing, and evaluation for all phases of spaceflight (ascent, entry, orbit, and interplanetary) and for all spacecraft with a specific focus on human spacecraft.

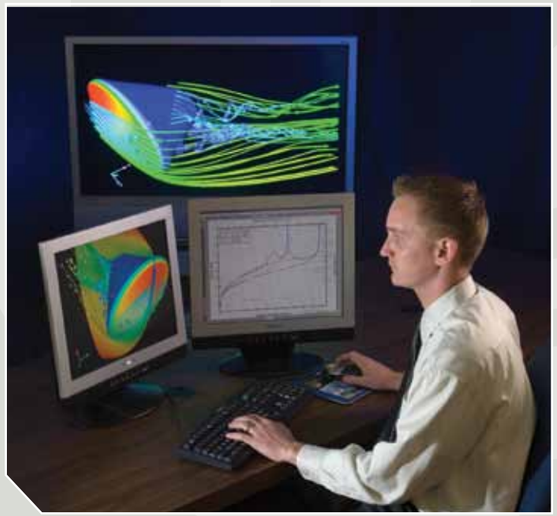
Landing Recovery Design

Ascent and Abort Performance

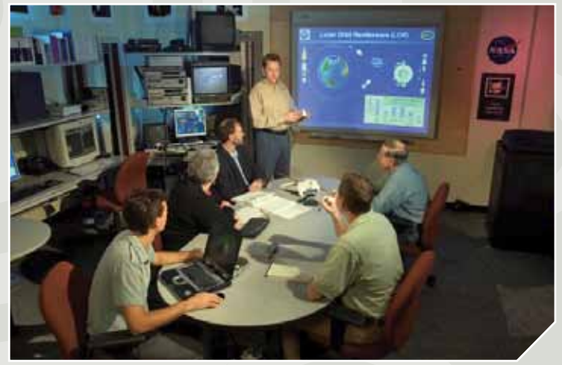
Proximity Operation Simulators and Software Development



Automated Rendezvous and Docking Systems



Entry Performance



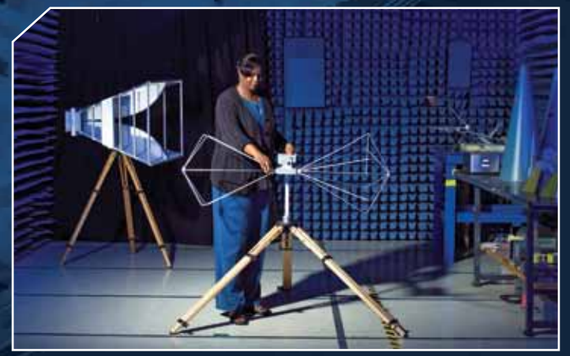
On-Orbit Flight and Trajectory Design

Integrated Environments Testing and Analysis

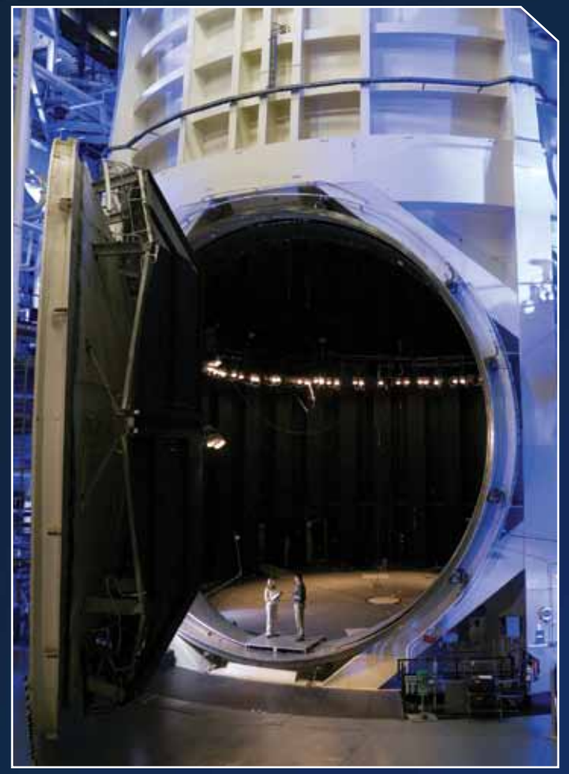
The **Johnson Space Center** was established for manned space vehicles from early concept to certified spaceflight vehicles and components. The integrated environments facilities test, evaluate, and certify for spaceflight. These facilities and capabilities include thermal vacuum chambers, entry environment testing, electromagnetic testing, hypervelocity impact resistance, mechanical and acoustic vibration, neutral buoyancy laboratory, and others.

Our analysis, modeling, and interpretation of test results are unique to the Johnson Space Center and critical to the future of human spaceflight.

Neutral Buoyancy Laboratory



Electromagnetic Interference and Compatibility Testing

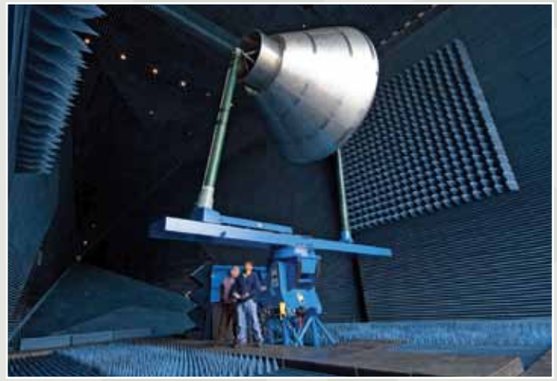


Space Environment Testing

Vacuum Chamber Testing

Vibration Testing

Atmospheric Re-entry Environment Testing



Antenna Testing

Thermal Testing

Human Rated Vacuum Testing

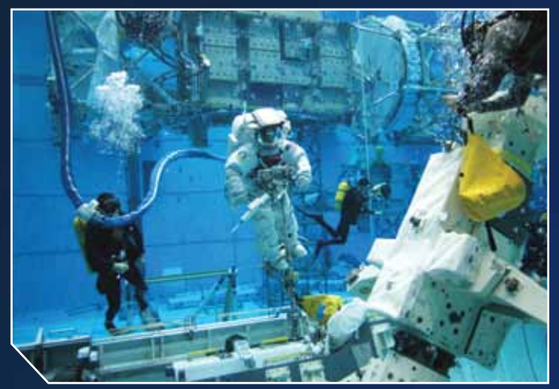
Projectile Testing

Mission Operations

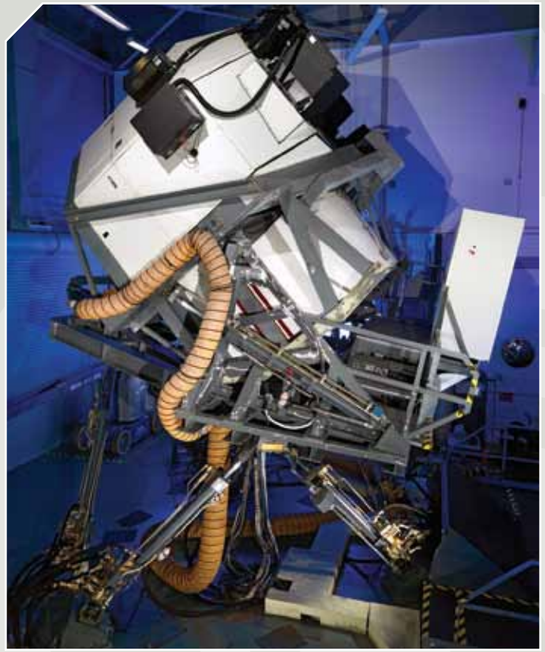
The **Johnson Space Center** offers capabilities in mission planning, crew training, flight product generation, and real-time operational support in the Mission Control Center. Our Plan-Train-Fly model incorporates over 45 years of expertise, leadership, and valuable lessons learned that creates a mission operations team of technical excellence, with the agility to fit any mission. This technical excellence is built upon our leadership culture, which provides integration of complex tasks, makes critical risk trades in safety, mission success, cost and schedule, and partners with industry to deploy innovative solutions to mitigate redesigns and ensure operable spacecraft systems.

Consult In Spacecraft Operations Design

Monitor On-Board Spacecraft Systems



Train Flight Crew for Spacewalks



Spaceflight Simulation Systems

Spaceflight Planning

Train Flight Crews for Spaceflight Systems

Train Flight Crews for In-Flight Procedures

NASA Johnson Space Center Facilities

Intergrated Human Space Vehicle Systems

- Electronics Development Laboratory
- Mechanical Development Laboratory
- Space Systems Automated Integration and Assembly Facility
- Integration Test Facilities
- Structures Test Laboratory
- General Vibration Laboratory
- Modal Operations Laboratory
- Sonic Fatigue Laboratory
- Spacecraft Acoustic Laboratory
- Spacecraft Vibration Laboratory
- Atmospheric Re-entry Materials and Structures Evaluation
- Materials Evaluation Laboratory
- Energy Systems Test Area (ESTA)
- Spacecraft Software Engineering Facilities
- Six-degree-of-freedom Dynamic Test Systems (SDTS)

Integrated Environments Testing and Analysis

- Electromagnetic Interference/Electromagnetic Compatibility Test Facility
- Antenna Test Facility
- Anechoic Chamber, Far-Field Test Facility
- Anechoic Chamber, Near-Field Test Facility
- Anechoic Chamber, Outdoor Antenna Range
- Air Bearing Floor
- Active Response Gravity Offload System
- Image Science and Analysis Laboratory
- Altitude/Environmental/Space Testing Facilities
- Human Space Environment Testing
- Space Materials Testing & Fabrication
- Titan Instrument Space Materials Testing Laboratories

Life Support Systems and Environmental Control

- Air Revitalization Technology Evaluation Facility
- Gas Lab for Analytical Chemistry
- Advanced Water Recovery Systems Laboratory Hypervelocity Impact Test Facility
- Anthropometry and Biomechanics Facility
- Usability Testing and Analysis Facility
- Graphics Research Analysis Facility
- Habitability Design Center
- Lighting Environment Test Facility
- Acoustics and Noise Control Laboratory
- Animal Care Facility
- Microbiology Laboratory
- Space Radiation Dosimetry Lab
- Toxicology Laboratory
- Water and Food Analytical Laboratory
- Countermeasures Development Laboratory

Flight Design

- Flight Mechanics Laboratory
- Aeroscience and Computational Fluid Dynamics Laboratory
- Advanced Guidance, Navigation, and Control Development Laboratory
- Kedalion Laboratory
- Systems Engineering Simulator
- Reconfigurable Operational Cockpit
- Concept Exploration Laboratory

Mission Operations

- Neutral Buoyancy Laboratory
- Spacecraft Motion-Based Simulator
- Spacecraft Fixed-Based Simulator
- Single Systems Trainer Simulators
- Space Station Training Facility
- Space Vehicle Mockup Facility
- Mission Control Center Facility

For information on these facilities, availability and point of contact go to:
http://jsceng.nasa.gov/

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http://jsceng.nasa.gov/

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